Set Name side by side	Query	Hit Count	Set Name result set
	DB=USPT; PLUR=YES; OP=OR		
L22	L17 same l9	0	L22
L21	L20 same metric	0	L21
L20	L17 same performance	304	L20
L19	L17 same l4	0	L19
L18	L17 same l1	0	L18
L17	switch$ near4 link	10763	L17
L16	L14 and violation	0	L16
L15	L14 and l9	0	L15
L14	5495471[pn]	1	L14
L13	L12 same l9	10	L13
L12	decod$ same violation	522	L12
L11	L10 same performance	0	L11
L10	L9 same l4	24	L10
L9	transmission adj1 code	1783	L9
L8	L7 same l3	49	L8
L7	restor$ or adjust$	1262994	L7
L6	L3 and l4	3	L6
L5	L4 same l3	0	L5
L4	code near3 violation	633	L4
L3	L2 same l1	112	L3
L2	monitor$ or restor$ or adjust$	1460778	L2
L1	performance adj1 metric	551	L1

END OF SEARCH HISTORY

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L8: Entry 47 of 49 File: USPT Feb 27, 1996

DOCUMENT-IDENTIFIER: US 5495471 A
TITLE: System and method for restoring a telecommunications network based on a two prong approach

Detailed Description Text (32):
In evaluating the algorithm of the present invention against other restoration techniques, five performance metrics were identified. They are:

Detailed Description Text (40):
Performance metrics 1 and 2, when combined, are the most critical performance criteria for any network restoration algorithm. The ideal is a 100% restoration within two seconds. In situations in which an algorithm cannot achieve full restoration within two seconds, the rate at which the algorithm restores lost channels can be important. FIG. 8 illustrates this point. The vertical axis represents level of restoration and the horizontal axis the time required to achieve that level of restoration. The two curves represent the rate at which two algorithms, 1 and 2, achieve increasing levels of restoration. Three time marks, A, B, and C, are shown. If two seconds of elapsed time occurs at time mark C, then both algorithms have restored 100%. If, however, two seconds of elapsed time occurs at time mark A, then algorithm 1 is clearly superior to algorithm 2 as it achieves a higher level of restoration. On the other hand, if two seconds of elapsed time occurs at time mark B, then the restoration level achieved by algorithm 2 is higher than algorithm 1.

Detailed Description Text (41):
Performance metric 3, utilization of spare channel resources, refers to how many spare channels are switched to working channels to replace lost working channels. All link restoration approaches require at least twice as many spare channels to replace the working channels lost. Since bandwidth is a limited (and expensive) resource within the network, it is desirable that as few spare channels as possible be employed in the restoration solution.

Detailed Description Text (42):
The range of application performance metric refers to what different kinds of failure scenarios the algorithm can be applied to affect restoration. A number of the proposed distributed algorithms can only address single link failures. A limited number of algorithms can be used to restore lost working channels in multiple link failure and node failure scenarios.

Detailed Description Text (43):
The message volume performance metric refers to how many network restoration messages are generated by a restoration algorithm. It is desirable that the number of messages an algorithm generates be as few as possible. Not only does message volume affect performance metric 1 (time to restore), it also limits other network restoration message traffic flow during the restoration process which may be of high or critical priority.

Detailed Description Text (44):
It should be noted that the number of distinct paths an algorithm uses in its restoration solution have not been included among the performance metrics. Although a high correlation has been found between the number of paths used in a restoration solution and the time to restoration metric of a specific algorithm, when comparing across algorithms, this correlation does not exist. As regards the merits, in and of itself, for having fewer or greater numbers of paths in a restoration solution, no particular benefit is found for either one. In general, while some differences were found among the several algorithms in the number of distinct paths used in the final restoration solutions, they often are the same and reflect more the topology of the

network and the location of the link failure, rather than the heuristic methods of the algorithms.

Detailed Description Text (53):
Functional characteristic 1, find paths, relates to how an algorithm identifies possible restoration paths. Most distributed algorithms use some form of flooding to do this. Ideally, all paths which can be used in restoration are identified. There are also two approaches in finding paths. One is to limit, through some heuristic mechanism, path finding to a subset of all paths in a network. The other approach is to perform an exhaustive tracing of all paths in the network. This functional characteristic is fundamental to the performance of the algorithm, as it affects all other functional characteristics and the final Performance metrics.

Detailed Description Text (98):
In general, the two prong algorithm performed better than the other algorithms with respect to the time to restoration performance metric. This is primarily due to the aggressive nature of the algorithm in identifying, selecting and connecting restoration paths. The algorithm's time to restoration performance is also enhanced in that the hand shaking required to make final connection of the disrupted ends of the lost channels is done over connected paths. In smaller networks, the RREACT algorithm is able to compete relatively closely to the two prong algorithm in terms of time to restoration. But as network size increases (as shown by the US Net results), the two prong algorithm is able to clearly outperform REACT in this regard. This is due to a high degree of congestion at the Chooser node in the RREACT algorithm, while the Origin nodes in the two prong algorithm have a much lower level of congestion.

L10: Entry 21 of 24 File: USPT Oct 4, 1983

DOCUMENT-IDENTIFIER: US 4408325 A
TITLE: Transmitting additional signals using violations of a redundant code used for transmitting digital signals

Abstract Text (1):
At a transmitter of a digital transmission system which uses a redundant transmission code to transmit data, at least one predetermined code combination which occurs randomly in the encoded data is selectively modified, to form a predetermined code violation, in dependence upon an additional signal which is to be transmitted. At a receiver, the predetermined code violation is detected and corrected to reproduce the additional signal and the data. By selection of appropriate code combinations and violations more than one additional signal can be transmitted. The arrangement is particularly suitable for transmission of additional signals, which may comprise protection switching signals or a digital voice channel signal, via fiber optic transmission links using 2AMI encoding.

Brief Summary Text (4):
According to one aspect of this invention there is provided à method of transmitting an additional signal via a transmission link via which a digital signal is transmitted from a transmitter to a receiver using a redundant transmission code, comprising: at the transmitter, in dependence upon said additional signal, selectively modifying a predetermined code combination, which occurs randomly in the encoded digital signal, to produce a predetermined code violation, and transmitting the encoded selectively modified digital signal; and at the receiver, detecting and correcting each such predetermined code violation to reproduce said additional signal and said digital signal.

Brief Summary Text (5):
According to another aspect of this invention there is provided a method of transmitting an additional signal via a transmission link via which a digital signal is transmitted from a transmitter to a receiver using a redundant transmission code, comprising: at the transmitter, in dependence upon said additional signal, selectively modifying each of two predetermined complementary code combinations, each of which occurs randomly in the encoded digital signal, to produce respective predetermined complementary code violations, and transmitting the encoded selectively modified digital signal; and at the receiver, detecting and correcting each of said predetermined code violations to reproduce said additional signal and said digital signal.

Brief Summary Text (6):
Thus in the present invention at least one randomly occurring code combination is effectively modulated, by modifying it to a code violation or leaving it unmodified, by the additional signal which is to be transmitted. Thus part of the existing redundancy of the transmission code is made use of to transmit the additional signal, and there is no increase in bit rate or requirement for complicated circuitry or a separate transmission link. Furthermore, there is very little degradation of the quality of the transmitted digital signal.

Brief Summary Text (9):
The particular forms of the predetermined code combination(s) and code violation(s) are dependent upon the particular transmission code which is used. Any one of a variety of redundant transmission codes, such as 2AMI and similar 1B2B codes, CMI, 2B3B, and 3B4B, may be used. Because 2AMI is increasingly being used as a transmission code, in particular for transmission of digital signals via fiber optic systems in telephony, the application of the invention to this code is described in detail below. However, it should be appreciated that the invention is similarly applicable to other redundant

transmission codes.

Brief Summary Text (12):
The selection of the predetermined code combination(s) and code violation(s) which are used is dependent upon the transmission code, error monitoring requirements, and other factors, and is best illustrated by the following example for 2AMI encoding in which each code combination comprises a four bit sequence in which one bit is changed to produce the code violation. The following table shows the various possible code combinations (excluding those which are themselves code violations) and the corresponding code violations.

Brief Summary Text (19):
According to another aspect, this invention provides a digital transmission system in which data is transmitted from a transmitter to a receiver using a redundant transmission code, comprising: at the transmitter, means responsive to a signal to selectively modify a predetermined code combination, which occurs randomly in the encoded data, to produce a predetermined code violation, the encoded selectively modified data being transmitted; and at the receiver, means for detecting and correcting such predetermined code violations to reproduce said signal and said data. At each of the transmitter and the receiver, the relevant means can conveniently comprise a shift register together with logic means such as gating circuitry or a programmable read only memory (PROM).

CLAIMS:

5. A method as claimed in claim 1 or 2 wherein said transmission code is 2AMI and said predetermined code combination and said predetermined code violation comprise the bit sequences 1011 and 1111 respectively, or the bit sequences 0100 and 0000 respectively.

6. A method as claimed in claim 1 or 2 wherein said transmission code is 2AMI produced from a zero-substituted signal, and said predetermined code combination and said predetermined code violation comprise the bit sequences 01011 and 01111 respectively, or the bit sequences 10100 and 10000 respectively.

12. A method as claimed in claim 8 or 9 wherein said transmission code is 2AMI, said predetermined complementary code combinations comprise the bit sequences 1011 and 0100, and said predetermined complementary code violations comprise the bit sequences 1111 and 0000.

13. A method as claimed in claim 8 or 9 wherein said transmission code is 2AMI produced from a zero-substituted signal, said predetermined complementary code combinations comprise the bit sequences 01011 and 10100, and said predetermined complementary code violations comprise the bit sequences 01111 and 10000.